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GB 2296357 A GB 2279475 A EP 0843456 A1
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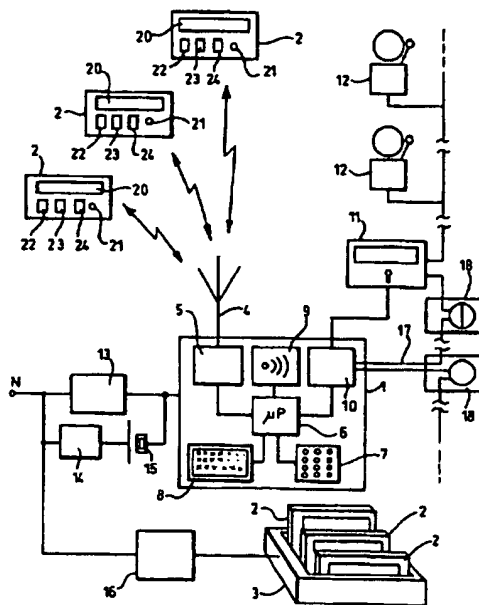
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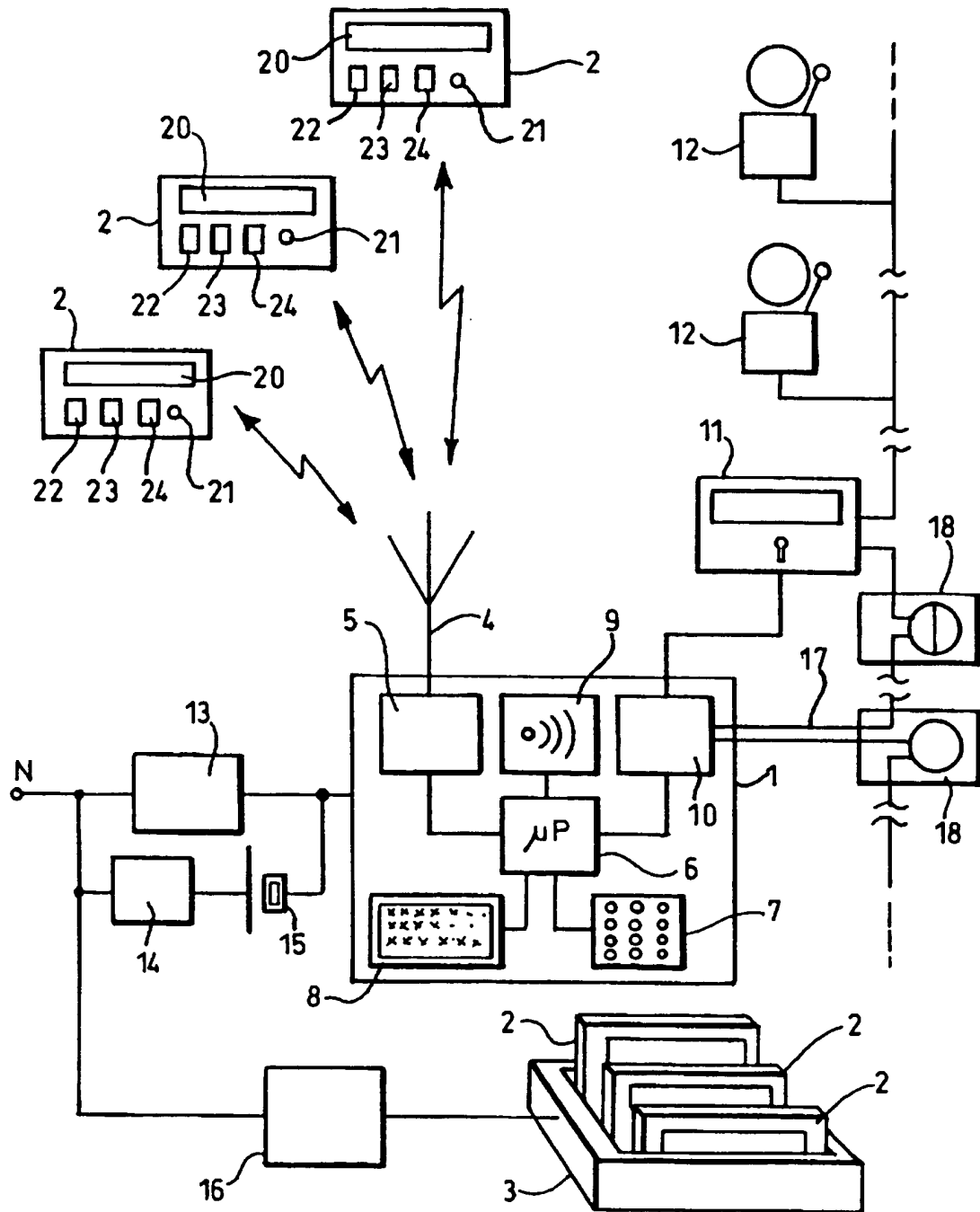
(54) Abstract Title

Security system

(57) A security system is intended primarily for use in a school, hospital or like location for enabling personnel to summon assistance from a central location or for initiating a general alarm situation. One objective is to achieve a low-cost system which does not require extensive wiring installation. The system comprises wireless communications apparatus including a base station (1) and a number of paging units (2) in radio communication with the base station. The base station can send messages to selected pager units or receive 'assistance requested' or 'evacuate building' messages from the pagers. The base station can be connected to a fire alarm system already installed in the building, for example by being connected direct to the control panel (11) of the system or to a break glass switch (18) forming part of the system. The base station can cause the fire alarm to produce an alarm sound which is different to that indicating a fire, for example intermittent ringing as opposed to one which is continuous.



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A SECURITY SYSTEM

This invention relates to a security system for use in a school, hospital, workplace or like location for enabling personnel to communicate with and summon assistance from a
5 base station.

According to one aspect of the invention, there is provided a security system for use in a school, hospital, workplace or like location for enabling personnel to communicate with and summon assistance from a base station, the system comprising a wireless
10 communications transmitter/receiver at said base station and a plurality of pager units for being held by respective personnel and operable for receiving signals from the base station and making available corresponding messages to the holders of the pager units, and also operable for enabling said holders to send signals to the base station that identify the pager unit or its holder and indicate a requirement for assistance or other situation of concern.

15 Preferably, each pager unit comprises a first switch for sending a signal to the base station that indicates a requirement for assistance and a second switch for sending a signal to the base station that indicates another predetermined situation of concern, for example a warning to evacuate a building in which said holder is located.

20 Preferably, each pager unit comprises a third switch for sending an acknowledgement to the base station after receiving a message therefrom.

As an alternative to the above, each pager unit may comprise a single switch
25 which is operable for sending different signals to the base station.

For example, said single switch can be a push button switch and be operable for sending different signals to the base station by being pressed for respective time durations and/or numbers of times.

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The base station is most preferably coupled to an alarm system such as a fire alarm installation, and the pager unit may then be operable via the base station for setting off the alarm system. The alarm system is preferably a pre-existing one in an environment. This significantly reduces the cost of the security system.

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Advantageously, said alarm system is operable for producing one alarm sound in response to detectors comprised in the alarm system, while the base station is operable for causing the alarm system to produce a different alarm sound in response to a signal from the pager unit.

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Advantageously, the base station is operable for locking out signals from a pager unit believed to be lost. Also, the system may include at least one wireless relay station for receiving signals from a pager unit, amplifying them and passing them on to the base station.

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For a better understanding of the invention, reference will now be made, by way of example, to the accompanying drawing, the single figure of which is a partly diagrammatic and partly pictorial view of an alarm and paging system.

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The illustrated system comprises a base station 1 and several pocket-sized, Nicad battery driven, paging units 2, some of which are loaded into a charging rack 3 while the others are out with respective users at various remote locations, normally in or around the building where the system is installed. The remote paging units and the base station 1 are in radio communication one with another.

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The base station 1 comprises an antenna 4 connected to an RF sender/receiver 5. The sender/receiver 5 is coupled to a microprocessor based computer system 6 which is also connected to a key pad 7 and a liquid crystal display unit 8. Within the base station 1, also connected to the computer system 6, there is a sounder 9 and a relay 10. The relay 10 is connected to the control panel 11 of a fire alarm system which also includes several

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alarm bells 12 (only two of which are shown). The fire alarm system is preferably one which is already in place in the building or other environment. The base station 1 is supplied with power by a mains driven power supply 13 with a battery back-up comprising a charger 14 and a Nicad battery 15.

5

The charging rack 3 is positioned alongside the base station 1, or at some other convenient location, and is operable for storing and charging pager units 2 overnight. The charging rack 3 is supplied with power by a mains driven power supply 16.

10 Each pager unit 2 comprises a piezo-electric sounder (not shown) for alerting the user to the arrival of a message, a text display unit 20, an LED indicator 21 and three push button switches 22, 23 and 24 respectively. The three push button switches are operable for causing the pager unit 2 to transmit respective signals to the base station 1, namely a signal for acknowledging a message sent to the pager by the base station, a signal for indicating to
15 the base station that the holder of the pager requires assistance, and a signal for indicating a predetermined general alarm situation. This signal sets off the fire alarm system either normally, ie with the normal sound (usually a continuous ringing of the bells 12) that also represents detection of a fire or so as to produce some different sound, for example an intermittent ringing of the bells. As an alternative to what is shown, instead of the fire
20 alarm system being set off automatically when a general alarm signal is received at the base station, the system could allow for operator intervention at this point, ie the general alarm could be flagged up by the sounder 9 and display unit 8 but the fire alarm not set off until this is done by an operator using a suitable switch (not shown) near the base station 1.

25 Each pager unit 2 also comprises a power saving circuit (not separately shown) operable to enter the pager unit into a standby mode in which the RF section of the pager unit is only turned on intermittently, say every other millisecond or a few milliseconds in every quarter of a second. This mode is maintained until a signal is received from the base station during one of the ON periods or until one of the switches 23 and 24 are operated to
30 indicate that a signal is to be sent to the base station.

Within each pager unit 2 there is also a low battery detection circuit (not shown) connected to the LED indicator and operable, when the battery charge is low, to make the indicator flash ON and OFF, say once each second.

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Each pager unit 2 has an address which is unique within the system. The address is set by the setting of a DIL switch (not shown) within the pager unit or by being programmed with a stored digital signal. The programming is done by a separate programmer (not shown) or by the computer 6 and keypad 7. The programming could be done whilst the pager units are loaded into the charging rack 3. When any pager unit
10 supplies a signal to the base station, the pager address is included as part of that signal. The addresses are loaded into the base station 1 with the identities of the holders of the respective pager units. Thus, the base station can identify the holder of a pager unit from which a signal is received.

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A system as described might be installed in a small primary school say, with the pager units issued to the headmaster, secretary, caretaker and teachers and the base station located at the school administrative centre, eg in the secretary or headmaster's office.

20

The headmaster or secretary can then use the base station to send messages to other staff members either individually or in particular combinations. As well as using switch 22 to acknowledge any message sent from the base station, each member of staff can use switch 23 on his pager to request assistance, or he can operate switch 24 to initiate a predetermined general alarm for example to evacuate the school in accordance with a pre-
25 arranged evacuation drill. If assistance is requested, the internal sounder 9 operates and the relevant staff member is identified on the display 8. Assistance is then dispatched from the base station. If a general alarm is signalled, the relevant staff member is again identified on the display 8 but a different tone is now produced by the sounder 9, and the fire alarm system is set off.

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The display 20 in each pager unit 2 could be discarded if required – then the pager would simply give an audible request to carry out a predetermined action, for example to call the school secretary or go to the administration centre. Instead of the three switches 22, 23 and 24, each pager unit could have just one switch, say a push button switch operable to send different signals for example by being pressed momentarily one or more times or continuously.

In the illustrated embodiment, the relay 10 of base station 1 is connected directly to the fire alarm control panel 11. In case the fire alarm control panel 11 and base station 1 are not located close to one another, it may be more convenient for the relay to be connected (as shown by dashed lines 17) to one of the senders 18, for example a break glass switch, forming part of the fire alarm system.

The system may be rather larger than is implied above, for example it might have to allow for several hundred pager units in a hospital or large school. The system may be adapted as appropriate. For example, instead of rack 3, it may be best simply to provide individual proprietary chargers (not shown) for each pager unit. It is likely also that one or more repeaters (not shown) will be needed – the repeaters are operable to receive RF signals from nearby pager units, to amplify those signals and to re-transmit them, perhaps by way of a directional transmit antenna so that the signals are better focussed towards the base station 1.

Whatever the size of the system, it may be that the base station 1 and pager units 2 have to be programmed to operate according to a protocol that prevents two or more pager units transmitting at the same time, for re-transmitting signals if they are not acknowledged, and for checking and correcting transmission errors. It may also be helpful to provide for logging calls and for transmitting signals containing a master address that should elicit a response from all pager units – this enables a check to be made to ensure that all pager units are working and/or that the holders are able to respond. The pager units could even be arranged to indicate, as part of the acknowledged signal, whether or not the battery charge

is low and the base station can be arranged, as part of the periodic check on all pager units 2, to log which ones are going to need recharging soon. Of course, instead of the base station issuing a single check signal to all the pager units 2 at once, it could be arranged to check them automatically but individually one at a time.

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The programming of the base station 1 and pager units 2 along the lines discussed above are within the purview of those skilled in the art of building microprocessor controlled apparatus. Various other features of the same kind are envisaged, for example:-

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Especially for a large system with up to two hundred and fifty pager units not having a message display, a call procedure/operating method for the base station might be as follows:-

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Outgoing Calls

1. Type in pager number and enter it with “#” or “*”.
2. The entry symbol would cause the base unit to send one or two codes resulting in different tones being sounded by the pager.
- 20 3. Type in next pager number, etc, etc.
4. Base unit will transmit the numbers in sequence.
5. On receipt of an acknowledgement, the number will be deleted from the list.
6. The base unit will display, sequentially, the outstanding (un-acknowledged) numbers.
- 25 7. The base unit will re-transmit periodically the un-answered calls.
8. It is proposed that address number “0” would summon all pagers.
9. Action by the recipients would be to acknowledge as above and then carry out whatever further action, if any, has been agreed (eg phone secretary’s office when convenient).

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Incoming Calls

1. Depending on the type of message received:
 - 1.1 Cancel number from outstanding call list or;
 - 1.2 Operate base unit sounder and flash pager number or;
 - 5 1.3 Operate main alarm, base unit sounder and flash pager number.
2. In the latter two cases, the alarms would be cancelled by pressing “#” followed by “*”.

Programming Functions

- 10 1. To input or edit the list of active pagers, type a code say “991*” and the first entry will be displayed. To change the entry, it should be overtyped with the revised number or with 000 to cancel. Press “#” for next entry and, when required, “*” to exit.
- 15 2. To transmit a (basic) test signal for walk tests, site evaluation and installation purposes, type say “992*”. The display is undefined at this stage. Press “*” to exit.
3. To set a pager address, type say “993*” followed by the pager number, followed by “*”.
4. Other programming functions would be accessed in a similar way.

CLAIMS

1. A security system for use in a school, hospital, workplace or like location for enabling personnel to communicate with and summon assistance from a base station, the
5 system comprising a wireless communications transmitter/receiver at said base station and a plurality of pager units for being held by respective personnel and operable for receiving signals from the base station and making available corresponding messages to the holders of the pager units, and also operable for enabling said holders to send signals to the base station that identify the pager unit or its holder and indicate a requirement for assistance or
10 other situation of concern.
2. A system according to Claim 1, wherein the base station is coupled to an alarm system and the pager unit is operable via the base station for setting off the alarm system.
- 15 3. A system according to Claim 2, wherein the alarm system is a fire alarm system.
4. A system according to Claims 2 or 3, wherein the alarm system is pre-existing at the location.
- 20 5. A system according to Claims 2, 3 or 4, wherein said alarm system is operable for producing one alarm sound in response to detectors comprised in the alarm system, and wherein the base station is operable for causing the alarm system to produce a different alarm sound in response to a signal from the pager unit.
- 25 6. A system according to any preceding claim, wherein each pager unit comprises a first switch for sending a signal to the base station that indicates a requirement for assistance and a second switch for sending a signal to the base station that indicates another predetermined situation of concern, for example a warning to evacuate a building in which said holder is located.

7. A system according to Claim 6, wherein each pager unit comprises a third switch for sending an acknowledgement to the base station after receiving a message therefrom.
8. A system according to any of Claims 1 to 5, wherein each pager unit comprises a
5 single switch which is operable for sending different signals to the base station.
9. A system according to Claim 5, wherein said single switch is a push button switch and is operable for sending different signals to the base station by being pressed for respective time durations and/or numbers of times.
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10. A system according to any preceding claim, wherein the base station is operable for locking out signals from a pager unit believed to be lost.
11. A system according to any preceding claim, including at least one wireless relay
15 station for receiving signals from a pager unit, amplifying them and passing them on to the base station.
12. A security system substantially as hereinbefore described with reference to the accompanying drawing.



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Claims searched: 1-12

Examiner: Mike Davis
Date of search: 11 December 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): G4H (HNHE, HNEC, HNEE, HNEM, HNNB)

Int Cl (Ed.6): G08B

Other: Online: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2279475 A (MULTITONE ELECTRONICS) eg abstract, page 6 lines 17-19 and page 7 lines 6-13	1-12
X	GB 2296357 A (HUANG) eg abstract, page 7 lines 18-22 and page 9 lines 10-14	1-12
X	EP 0843456 A1 (OEPEN) eg abstract and column 3 lines 18-19	1-12
X	EP 0372640 A1 (ERICSSON PAGING SYSTEMS) eg abstract and column 5 lines 5-20	1-12
X	WO 96/26580 A1 (COSTIGAN) eg lines 481-497 and 708-743	1-12
X	US 5218344 (RICKETTS) eg abstract and column 6 line 41 to column 7 line 1	1-12

X Document indicating lack of novelty or inventive step
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